In the Claims

1.-25. (Canceled)

26. (New) A method of inducing the production of granulocytes in a subject in need, comprising administering a therapeutically effective amount of an AChE-derived peptide, or functional fragments, derivatives or a composition thereof to said subject, wherein said peptide is denoted by SEQ. ID. NO.1.

27. (New) A method for inducing repopulation and/or rematuration of granulocytic cell populations in a subject in need, comprising administering a therapeutically effective amount of an AChE-derived peptide, or functional fragments, derivatives or a composition thereof to said subject, wherein said peptide is denoted by SEQ. ID. NO.1.

28. (New) A method of enriching a specific hematopoietic cell population *in vitro* or *in vivo*, comprising contacting a hematopoietic cell population with an effective amount of an AChE-derived peptide, or functional fragments, derivatives, or a composition thereof, wherein said specific hematopoietic cell population is a granulocytic cell population, and said peptide is denoted by SEQ. ID. NO.1.

29. (New) The method as defined in claim 28, wherein said enrichment of the granulocytic cell population is evidenced by an increase in the level of mature granulocytes as compared to the level of one of committed progenitor cells, committed myeloid cells, immature myeloid cells and immature granulocytes, following contact with said peptide, or fragments, derivatives, or a composition comprising thereof.

30. (New) A method of *ex vivo* or *in vitro* manipulating cells to induce granulocyte cell differentiation, said method comprising contacting a hematopoietic cell population with an

effective amount of an AChE-derived peptide, or functional fragments, derivatives, or a composition thereof , wherein said peptide is denoted by SEQ. ID. NO.1.

31. (New) A method for the treatment of leucopenia in a subject in need, said method comprising administering a therapeutically effective amount of an AChE-derived peptide, or functional fragments, derivatives or a composition thereof to said subject, wherein said peptide is denoted by SEQ. ID. NO.1.

32. (New) A method of treatment of conditions that trigger low cell count of granulocytes, comprising the steps of administering a therapeutically effective amount of an AChE-derived peptide, or functional fragments or derivatives, or a composition thereof to a subject in need, wherein said AChE-derived peptide is denoted by SEQ. ID. NO.1.

33. (New) A method of treatment of conditions that trigger low cell count of leukocytes, comprising the steps of administering a therapeutically effective amount of an AChE-derived peptide, or functional fragments, derivatives or a composition thereof to a subject in need, wherein said AChE-derived peptide is denoted by SEQ. ID. NO.1.

34. (New) A method for the prevention and/or treatment of conditions wherein lymphocyte activity is reduced, such as chronic stress, autoimmune diseases, inflammation, rheumatoid arthritis, multiple sclerosis (MS), amyotrophic lateral sclerosis (ALS), fibromyalgia, multiple chemical sensitivity, post-irradiation, chemotherapy in a subject in need, comprising administering a therapeutically effective amount of an AChE-derived peptide, or functional fragments, derivatives or a composition thereof, to an individual suffering or prone to said conditions, wherein said peptide is denoted by SEQ. ID. NO.1.

35. (New) A method for inducing a shift in the activity of lymphocytes *in vitro* or *ex vivo*,

comprising contacting an AChE-derived peptide with lymphocytes for a suitable period of time.

36. (New) A method for detecting changes in the activity of lymphocytes, comprising measuring the expression of AChE-R on the surface of lymphocytes.

37. (New) A method of treatment of conditions wherein lymphocyte activity is reduced, such as chronic stress, autoimmune diseases, inflammation, rheumatoid arthritis, multiple sclerosis (MS), amyotrophic lateral sclerosis (ALS), fibromyalgia, multiple chemical sensitivity, post-irradiation, chemotherapy in a subject in need, comprising obtaining blood from said subject, isolating immature cells and contacting said cells with an AChE-derived peptide, or functional fragments, derivatives, or a composition thereof, wherein said peptide is denoted by SEQ. ID. NO.1.

38. (New) A method of priming of hematopoietic stem cells pre-transplant, comprising obtaining said cells, isolating from said cells a immature, CD34+ rich population, and exposing said cell population to an AChE-derived peptide, or its functional fragments or derivates, or compositions comprising thereof, wherein said peptide is denoted by SEQ. ID. NO.1.

39. (New) The method as defined in claim 38, wherein said cells may be obtained from the subject in need of said transplant or from another donor.

40. (New) A method of inducing blood cells to produce cytokines, comprising obtaining said cells from a subject in need of cytokine-producing blood cells, isolating immature cells and contacting said cells with an AChE-derived peptide, or functional fragments, derivatives or a composition thereof, wherein said peptide is denoted by SEQ. ID. NO.1.

41. (New) The method as defined in claim 40, wherein said cytokines are selected from the

group consisting of TNFα, IL-6, and IL-1β, and thrombopoietin.